

US-PAT-NO: 6421698

DOCUMENT-IDENTIFIER: US 6421698 B1

TITLE: Multipurpose processor for motion estimation, pixel processing, and general processing

----- KWIC -----

Another source of data for buffer 120 is a flip-flop 138, which stores values from register file 130. Instructions that transfer data from register file 130 to buffer 120 allow use of buffer 120 as a fast scratch pad in general processing and pixel processing modes. Such data transfers between memories 130 and 120 are in parallel with execution of other instructions. A scale circuit 136 either passes data unchanged from register file 130 or changes the width of data values being transferred. For example, scale circuit 136 can truncate a 32-bit value calculated in general processing mode to eight bits for storage as a pixel value in buffer 120. Using scaling and packing of scaled values, four 64-bit values read from register file 130 can be packed into a single 64-bit value in flip-flop 138 before writing to buffer 120. Similarly,

transfers from buffer 120 to register file 130 can leave unchanged or expand values from buffer 120.

Multiply unit 150 and ALU 160 can conduct vertical filtering of an image array in a manner similar to half-pixel interpolation process. For example, for a **vertical FIR** filter, multiply unit 150 simultaneously multiplies eight pixel values from a row of an image array by a filter **coefficient** for the row, and ALU 160 adds the resulting products to previously calculated values in register 162. Multiply unit 150 and ALU 160 can similarly use register 162 in two-dimensional filtering of image arrays.